

Remarks

Claims 21 - 40 are pending. Favorable reconsideration is respectfully requested.

Applicant wishes to express his appreciation to Examiner Reddick for restarting the period for response. Applicant also wishes to apologize to the Examiner for the many errors of form present in the claims as previously amended. In view of these errors, Applicant has cancelled original claims 1 - 20 as amended, and added new claims 21 - 40. Applicant's attorney has carefully reviewed the new claims and believes that they fully comply with the requirements of 35 U.S.C. § 112. However, if further amendments are required in this respect, the Examiner is encouraged to telephone Applicant's attorney to facilitate early amendment and to expedite prosecution. Claims 21 - 40 are all directed to cementitious and cement-free construction adhesives, the preferred field of use of the polymers disclosed by Applicant.

The present invention is directed to an improvement in inorganic construction adhesives. Such construction adhesives include, as known to the skilled artisan, mortars for brick and tile laying, concrete, exterior insulation system adhesives, grouts, renders, plasters, stuccos, and the like. All these construction adhesives include cementitious (i.e. portland cement, pozzolanic cement, etc.) or non-cementitious (cement-free) binders such as gypsum or water glass. Additional customary ingredients include fillers, aggregate, viscosity control agents, thixotropes, setting retardants or accelerators, stabilizing agents, pigments, dyes, etc. All these components are well known.

It has become common to add film forming polymers in the form of aqueous dispersions or redispersible polymer powders to high quality versions of the products listed above. These polymers not only increase the workability of the adhesives prior to setting, but also increase the cured properties. In the past, the most common polymer additives have been vinyl acetate polymers, styrene-butadiene copolymers, vinyl chloride polymers, and

particularly, vinyl acetate-ethylene copolymers. In this field of endeavor, it is an aim of the industry to achieve high tensile strength, even under wet conditions. To improve upon the wet tensile strength, it has become the practice to impart hydrophobic character to the base polymer of the polymer dispersion, either by employing monomers bearing bulky hydrophobic groups such as the higher alkyl vinyl esters and higher alkyl acrylates and methacrylates, or by including hydrophobic comonomers such as vinyl chloride, the use of which is now environmentally disfavored.

Applicant has surprisingly discovered that the addition of very limited quantities of hydrophilic monomers, those with water solubilities in excess of that of vinyl acetate, improve wet tensile strength considerably, without detracting from the processability (workability) of the adhesive. Since water is known to decrease tensile strength, and as the incorporation of hydrophilic comonomers into the polymer should encourage water absorption as compared to hydrophobic comonomers, this result is highly unexpected. Moreover, not only are the hydrophilic monomers required, but their amounts are very small, i.e. from 0.2 to 1.5 weight percent. Even a slight increase to 2.0 weight percent results in decreasing tensile strength to the level attained by polymers with no hydrophilic monomers, and in most cases to appreciably below this value!

Claims 1- 20 had been rejected under 35 U.S.C. § 103(b) as anticipated, or under 35 U.S.C. § 103(a) as obvious over Schulze et al, U.S. Patent No. 5,498,665 ("Schulze"). This rejection is perhaps based on an inadvertent misunderstanding of the claim scope, as Applicant has carefully examined *Schulze* and fails to find any disclosure of the claimed subject matter, nor any teaching or suggestion thereof.

Schulze is not directed to an improvement in tensile strength. Rather, *Schulze* is directed to avoiding shrinkage in construction adhesives as they set, by including 1 to 20 weight percent of a polypropylene glycol (polyoxypropylene diol) in conjunction with a conventional dispersion polymer or redispersible powder prepared therefrom. The latter are described in column 2, line 61 to column 3, line 15, and contain only conventional components such as vinyl acetate, ethylene, vinyl chloride, and higher vinyl esters and/or (meth)acrylate

esters. No hydrophilic monomers are disclosed, nor are such taught or suggested. An example of such a polymer is the Comparison Example 1 polymer of the subject application, which contains vinyl acetate and ethylene in a 100:7 weight ratio.

As *Schulze* fails to disclose and further fails to teach or suggest polymer dispersions or redispersible polymer powders containing hydrophilic monomer-derived units, withdrawal of the rejections over *Schulze* as they might apply to the new claims is solicited.

Claims 1- 20 have been rejected under 35 U.S.C. § 102(e) and/or 35 U.S.C. § 103(a) over Schilling et al. U.S. Patent No. 5,932,647 ("*Schilling*"). *Schilling* is not directed to the presently claimed subject matter, but to wood glue in the form of a powder which can be mixed with water. Like many references directed to wood glues, a wide variety of comonomers in addition to the required vinyl ester (i.e. vinyl acetate) comonomers are suggested, including large amounts (10-65%) of vinyl aromatics, vinyl chlorides, and other "hydrophobic" monomers; 1 to 10% of α -olefin comonomers, and 0.05 to 10.0% of auxiliary monomers, some of which are hydrophilic (water soluble) in character, and some of which (i.e. divinyladipate), are not. Of the Examples, two (Examples 2 and 3) contain a hydrophilic monomer, but in amounts of 4 and 5 weight percent.

The requirements of wood glues are vastly different from the requirements of cementitious and cement-free mortars and tile adhesives and like construction adhesives, to which the present claims are directed. *Schilling* does not direct the skilled artisan to employ his wood glues in such applications. Moreover, *Schilling* does not direct the skilled artisan to polymer compositions containing only 0.2 to 1.5 weight percent hydrophilic monomers. The only examples include hydrophilic monomers in amounts of 4 and 5 weight percent. However, as abundantly shown in the present application, amounts higher than 1.5%, and in particular 3% or more, reduce tensile strength to values well below the tensile strength produced by the base polymer. Withdrawal of the rejection over *Schilling* is solicited.

Geissler discloses polymer dispersions and redispersible polymer powders which are for use in the same technical field as Applicant's, i.e. construction adhesives.

Geissler discloses that polymers prepared through use of water soluble cationic azo initiators are useful for this purpose. The monomers used to prepare the *Geissler* polymers include at least one vinyl ester monomer, preferably vinyl acetate, up to 50% of other copolymerizable monomers, and 0.1 to 5% of monocarboxylic acids, dicarboxylic acids, or mono or diesters of the latter.

The question of obviousness is resolved by addressing whether the reference would direct one skilled in the art to do what Applicant has done. Applicant submits that *Geissler* does not do so.

Geissler is not directed to the problem solved by Applicant: an increase in the tensile strength of building construction adhesives. Rather, *Geissler* is directed to improvements in the emulsion polymerization process of preparation of aqueous polymer dispersions, so as to prepare such dispersions with high solids content. It is well established that a reference which does not discuss the problem with which the inventors are concerned cannot suggest a solution. *In re Shaffer*, 108 U.S.P.Q. 326 (CCPA 1956). This has been the law for many years. It is also clear that a reference which does not address the problem solved, and thus does not render the invention obvious, cannot anticipate the invention within the meaning of 35 U.S.C. § 102. *In re Kalm*, 154 U.S.P.Q. 10 (CCPA 1967).

After all, most of the inventions which are patented throughout the world are "improvement" or "selection" inventions which are within the broad teachings of the prior art. This is true in the present case, where *Geissler* discloses the use of water soluble cationic azo-catalyst catalyzed dispersions for use in building adhesives. Most of the primary monomers and comonomers utilized in the subject invention polymers are identified by *Geissler*, as had, also, the art prior to *Geissler*. These monomers constitute a large, art-recognized shopping list of polymer constituents. It would be fair to say that by judicious selection of two or three references, nearly every possible monomer in virtually every combination and every weight percentage range would be "technically" covered. If patentability were based on such broad disclosures, patents would rapidly become a rarity. No new polymers or uses thereof would be patentable. Fortunately, the law recognizes that such broad disclosures are not patentability

defeating. They are certainly not anticipatory;¹ and for purposes of obviousness, there must be some motivation to single out from these references the particular combination claimed.

Here, *Geissler* names numerous possible monomers. After all, it is not the monomers with which *Geissler* is concerned, but the process by which they are polymerized.² So the question is this: would the skilled artisan, faced with the challenge of designing a polymer dispersion or redispersible polymer powder to increase the tensile strength of building adhesives, and having *Geissler* before him or her, be motivated to do as Applicant has done? The answer is clearly No!

Geissler did not prepare a single polymer within the scope of the claimed compositions. All the *Geissler* polymers are copolymers of vinyl acetate, vinyl versatate (C_{10} α -branched vinyl ester), and n-butyl acrylate, the latter two monomers being conventional hydrophobic monomers. Never having prepared any polymer containing hydrophilic monomers, *Geissler* could not be aware of the effects these monomers have on tensile strength when used in the inventive proportions.

Moreover, while there is no motivation in *Geissler* to specifically include hydrophilic monomers, if one were to do so, what amounts would he choose? *Geissler* teaches a wide range, with a preferred range of 0.1 to 5 weight percent. However, only a small portion of this range, 0.2 to 1.5%, is operable, as shown by Applicant's examples. That hydrophilic monomers work at all is surprising. That they only work in the limited range of 0.2 to 1.5% is highly unexpected. *Geissler* does not direct the skilled artisan to this range.

¹ See, i.e. *In re Petering*, 133 U.S.P.Q. 275 (CCPA 1962); *In re Kollman*, 201 U.S.P.Q. 193 (CCPA 1979). *In re Sivaramakrishnan*, 213 U.S.P.Q. 441 (CCPA 1982); *Ex parte Garvey*, 41 U.S.P.Q. 583 (POBA 1939); *Ex parte Starr*, 44 U.S.P.Q. 545 (POBA 1938).

² It may be of interest that Applicants does not use the azo catalysts by *Geissler*, nor are such commonly used in the industry.

Had one skilled in the art been motivated to employ one of *Geissler's* auxiliary monomers, and had this skilled worker chosen a value in the middle of *Geissler's* preferred range, i.e. 2 - 3% by weight, the skilled artisan would have concluded that including such monomers is to be avoided, since the tensile strengths of the cured cement compositions would have been worse than when no auxiliary monomer was used. The benefits of the subject invention would never have been revealed to the public. Withdrawal of the rejection over *Geissler* as it would apply to the new claims is solicited.

Applicant submits that the claims are now in condition for Allowance, and respectfully request a Notice to that effect. If the Examiner believes that further discussion will advance the prosecution of the Application, she is highly encouraged to telephone Applicant's attorney at the number given below.

A check in the amount of \$110.00 is enclosed to cover the Extension of Time Petition fee. Please charge any additional fees or credit any overpayments as a result of the filing of this paper to our Deposit Account No. 02-3978 -- a duplicate of this paper is enclosed for that purpose.

Respectfully submitted,

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